R&S®FSVR Real-Time Spectrum Analyzer

Specifications

ROHDE&SCHWARZ

Test & Measurement

Data Sheet | 02.00

CONTENTS

Definitions **3**

Specifications **4**

All operating modes **4**

Frequency 4

Signal and spectrum analyzer mode **5**

Sweep time 6

Resolution bandwidths 6

Level 6

Measurement speed 14

Trigger functions 14

I/Q data 14

Real-time spectrum analyzer mode **15**

Level 16

Result display 16

I/Q data 17

Trigger 18

Inputs and outputs **19**

General data **21**

Options **23**

R&S®FSV-B3 audio demodulator 23

R&S®FSV-B5 additional interfaces 23

R&S®FSV-B17 digital baseband interface 24

R&S®FSV-B21 LO/IF ports for external mixers (for R&S®FSVR30 and R&S®FSVR40 only) 24

Ordering information **25**

Options 25

Service options 26

Recommended extras 26

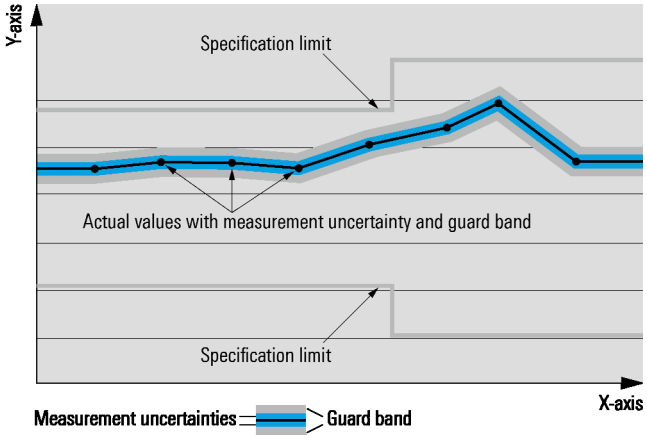
Power sensors supported by the R&S®FSV-K9 option 27

Definitions

General
Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits
Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as <, ≤, >, ≥, ±, or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



Specifications without limits
Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

Typical data (typ.)
Characterizes product performance by means of representative information for the given parameter. When marked with <, > or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Nominal values (nom.)
Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)
Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties
Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

Specifications

Operating modes	
	real-time spectrum analyzer
	signal and spectrum analyzer

All operating modes

Frequency

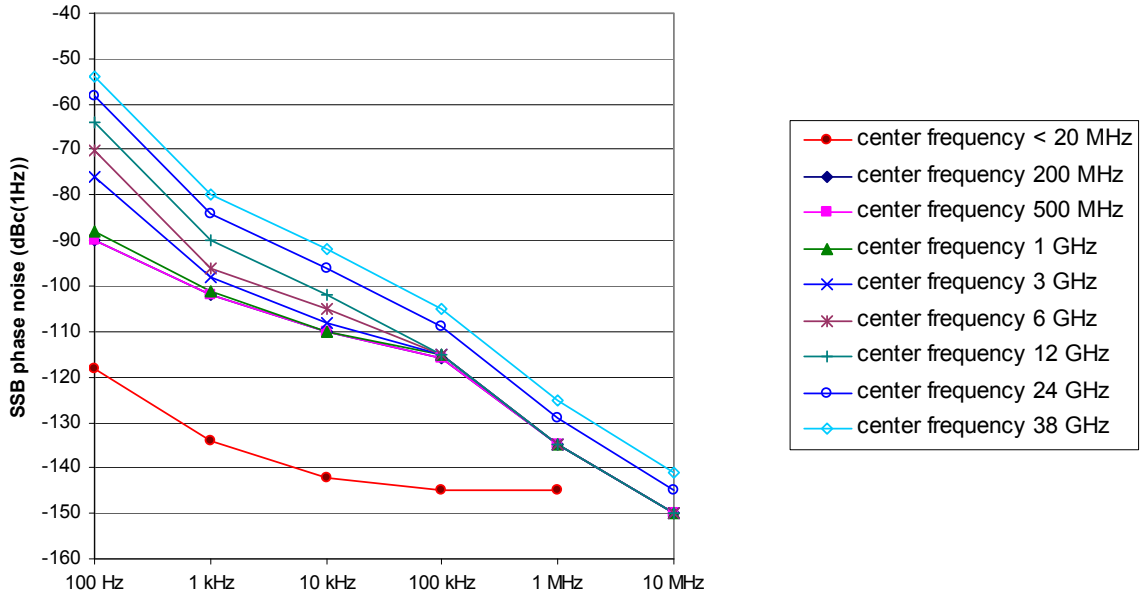
Frequency range	R&S®FSVR7	
	DC-coupled	10 Hz to 7 GHz
	AC-coupled	1 MHz to 7 GHz
	R&S®FSVR13	
	DC-coupled	10 Hz to 13.6 GHz
	AC-coupled	10 MHz to 13.6 GHz
	R&S®FSVR30	
	DC-coupled	10 Hz to 30 GHz
	AC-coupled	10 MHz to 30 GHz
	R&S®FSVR40	
	DC-coupled	10 Hz to 40 GHz
	AC-coupled	10 MHz to 40 GHz
Frequency resolution		0.01 Hz

Reference frequency, internal		
Accuracy		±((time since last adjustment × aging rate) + temperature drift + calibration accuracy)
Aging per year	standard	$\pm 1 \times 10^{-6}$
	with R&S®FSV-B4 OCXO reference frequency option	$\pm 1 \times 10^{-7}$
Temperature drift (+5 °C to +45 °C)	standard	$\pm 1 \times 10^{-6}$
	with R&S®FSV-B4, OCXO reference frequency option, model .02	$\pm 1 \times 10^{-7}$
	with R&S®FSV-B4, OCXO extended frequency stability option, model .03	$\pm 1 \times 10^{-8}$
Max. initial calibration accuracy	standard	$\pm 5 \times 10^{-7}$
	with R&S®FSV-B4 OCXO reference frequency option	$\pm 5 \times 10^{-8}$

Signal and spectrum analyzer mode

Frequency readout		
Marker resolution		1 Hz
Uncertainty		±(marker frequency × reference accuracy + 10 % × resolution bandwidth + ½ (span/(sweep points –1)) + 1 Hz)
Number of sweep (trace) points	default value	691
	range	101 to 32001
Marker tuning frequency step size	marker step size = sweep points	span/(sweep points – 1)
	marker step size = standard	span/(default sweep points – 1)
Frequency counter resolution	signal and spectrum analyzer mode only	0.001 Hz
Count accuracy	signal and spectrum analyzer mode only	±(frequency × reference accuracy + ½ (last digit))
Display range for frequency axis		0 Hz, 10 Hz to max. frequency
Resolution		0.1 Hz
Max. span deviation		±0.1 %

Spectral purity		
SSB phase noise	frequency = 500 MHz, carrier offset	
	100 Hz	< –84 dBc (1 Hz)
	1 kHz	< –101 dBc (1 Hz)
	10 kHz	< –106 dBc (1 Hz)
	100 kHz	< –115 dBc (1 Hz)
	1 MHz	< –134 dBc (1 Hz)
	10 MHz	< –150 dBc (1 Hz) (nom.)
Residual FM	frequency = 500 MHz, RBW = 1 kHz, sweep time = 100 ms	< 3 Hz (nom.)



Typical phase noise at different center frequencies.

Sweep time

Range	span = 0 Hz	1 µs to 16000 s
	span ≥ 10 Hz, swept	1 ms to 16000 s [1]
	span ≥ 10 Hz, FFT	7 µs to 16000 s [2]
Sweep time accuracy	span = 0 Hz	±0.1 % (nom.)
	span ≥ 10 Hz, swept	±3 % (nom.)

Resolution bandwidths

Sweep filters and FFT filters		
Resolution bandwidths (–3 dB)	span ≥ 10 Hz, sweep filters	1 Hz to 10 MHz in 1/2/3/5 sequence
	span ≥ 10 Hz, FFT filters	1 Hz to 300 kHz in 1/2/3/5 sequence
	span = 0 Hz	20 MHz, 28 MHz, 40 MHz [3] additionally
Bandwidth uncertainty		< 3 % (nom.)
Shape factor 60 dB:3 dB		< 5 (nom.)

Channel filters		
Bandwidths (–3 dB)	standard (RRC = root raised cosine)	100 Hz, 200 Hz, 300 Hz, 500 Hz
		1, 1.5, 2, 2.4, 2.7, 3, 3.4, 4, 4.5, 5, 6, 8.5, 9, 10, 12.5, 14, 15, 16, 18 (RRC), 20, 21, 24.3 (RRC), 25, 30, 50, 100, 150, 192, 200, 300, 500 kHz
		1, 1.228, 1.28 (RRC), 1.5, 2, 3, 3.84 (RRC), 4.096 (RRC), 5, 10, 20, 28, 40 MHz [3]
Bandwidth accuracy		< 2 % (nom.)
Shape factor 60 dB:3 dB		< 2 (nom.)

Video bandwidths		1 Hz to 10 MHz in 1/2/3/5 sequence, 20 MHz, 28 MHz, 40 MHz

Signal analysis bandwidth		40 MHz (nom.) [3]

Level

Display range		displayed noise floor up to +30 dBm

Max. input level		
DC voltage	AC-coupled	50 V
	DC-coupled	0 V
CW RF power	RF attenuation 0 dB	
	RF preamplifier = OFF	20 dBm (= 0.1 W)
	with R&S®FSV-B22 or R&S®FSV-B24 option, RF preamplifier = ON	13 dBm (= 0.02 W)
	RF attenuation ≥ 10 dB	
	RF preamplifier = OFF	30 dBm (= 1 W)
	with R&S®FSV-B22 or R&S®FSV-B24 option, RF preamplifier = ON	23 dBm (= 0.2 W)
Pulse spectral density	RF attenuation 0 dB, RF preamplifier = OFF	97 dB µV/MHz
Max. pulse voltage	RF attenuation ≥ 10 dB	150 V
Max. pulse energy	RF attenuation ≥ 10 dB, 10 µs	1 mWs

[1] Net sweep time without additional hardware settling time.

[2] Time for data acquisition for FFT calculation.

[3] YIG preselector = OFF with bandwidth = 40 MHz and f > 7 GHz.

Intermodulation		
1 dB compression of input mixer	RF attenuation 0 dB, RF preamplifier = OFF	
	f ≤ 7 GHz	+3 dBm (nom.)
	f > 7 GHz	+5 dBm (nom.)
	with R&S®FSV-B22 or R&S®FSV-B24 option, RF preamplifier = ON, RF attenuation 0 dB	
	f ≤ 7 GHz	–12 dBm (nom.)
	f > 7 GHz	–25 dBm (nom.)
Third-order intercept point (TOI)	RF attenuation 0 dB, level 2 × –15 dBm, ∆f > 5 × RBW or 10 kHz, whichever is larger, RF preamplifier = OFF	
	10 MHz ≤ f_{in} < 100 MHz	> 12 dBm, typ. 15 dBm
	100 MHz ≤ f_{in} < 3.6 GHz	> 13 dBm, typ. 16 dBm
	3.6 GHz ≤ f_{in} ≤ 40 GHz	> 15 dBm, typ. 18 dBm
	with R&S®FSV-B22 or R&S®FSV-B24 option, RF preamplifier = ON, RF attenuation 0 dB, level 2 × –45 dBm, ∆f > 5 × RBW or 10 kHz, whichever is larger	
	10 MHz ≤ f_{in} < 100 MHz	–3 dBm (nom.)
	100 MHz ≤ f_{in} < 3.6 GHz	–2 dBm (nom.)
	3.6 GHz ≤ f_{in} ≤ 7 GHz	0 dBm (nom.)
	7 GHz ≤ f_{in} ≤ 40 GHz	–10 dBm (nom.)
Second harmonic intercept (SHI)	RF attenuation 0 dB, level –10 dBm, RF preamplifier = OFF	
	100 MHz < f_{in} ≤ 3.5 GHz	45 dBm (nom.)
	3.5 GHz < f_{in} ≤ 20 GHz	
	standard	80 dBm (nom.)
	with R&S®FSV-B24 option	75 dBm (nom.)
	with R&S®FSV-B22 or R&S®FSV-B24 option, RF preamplifier = ON, RF attenuation 0 dB, level –40 dBm	
	100 MHz < f_{in} ≤ 3.5 GHz	25 dBm (nom.)
	3.5 GHz < f_{in} ≤ 20 GHz	25 dBm (nom.)

Displayed average noise level without preamplifier options		
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 5 Hz, VBW = 5 Hz, zero span, sweep time 500 ms, sample detector, trace average, sweep count = 20, mean marker	
	10 Hz	< –90 dBm (nom.)
	20 Hz	< –100 dBm, typ. –110 dBm
	100 Hz	< –110 dBm, typ. –120 dBm
	1 kHz	< –120 dBm, typ. –130 dBm
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 3 kHz, zero span, sweep time 50 ms, sample detector, trace average, sweep count = 20, mean marker	
	R&S®FSVR7	
	9 kHz ≤ f < 100 kHz	< –130 dBm, typ. –140 dBm
	100 kHz ≤ f < 1 MHz	< –145 dBm, typ. –150 dBm
	1 MHz ≤ f < 1 GHz	< –152 dBm, typ. –155 dBm
	1 GHz ≤ f < 3.6 GHz	< –150 dBm, typ. –153 dBm
	3.6 GHz ≤ f < 6 GHz	< –148 dBm, typ. –151 dBm
	6 GHz ≤ f ≤ 7 GHz	< –146 dBm, typ. –149 dBm
	R&S®FSVR13, R&S®FSVR30	
	9 kHz ≤ f < 100 kHz	< –130 dBm, typ. –140 dBm
	100 kHz ≤ f < 1 MHz	< –145 dBm, typ. –150 dBm
	1 MHz ≤ f < 1 GHz	< –151 dBm, typ. –154 dBm
	1 GHz ≤ f < 3.6 GHz	< –149 dBm, typ. –152 dBm
	3.6 GHz ≤ f < 6 GHz	< –146 dBm, typ. –149 dBm
	6 GHz ≤ f < 7.4 GHz	< –144 dBm, typ. –147 dBm
	7.4 GHz ≤ f < 15 GHz	< –147 dBm, typ. –150 dBm
	15 GHz ≤ f ≤ 30 GHz	< –142 dBm, typ. –145 dBm
	R&S®FSVR40	
	9 kHz ≤ f < 100 kHz	< –130 dBm, typ. –140 dBm
	100 kHz ≤ f < 1 MHz	< –145 dBm, typ. –150 dBm
	1 MHz ≤ f < 1 GHz	< –151 dBm, typ. –154 dBm
	1 GHz ≤ f < 3.6 GHz	< –149 dBm, typ. –152 dBm
	3.6 GHz ≤ f < 6 GHz	< –146 dBm, typ. –149 dBm
	6 GHz ≤ f < 7.4 GHz	< –144 dBm, typ. –147 dBm
	7.4 GHz ≤ f < 15 GHz	< –144 dBm, typ. –147 dBm
	15 GHz ≤ f < 34 GHz	< –140 dBm, typ. –143 dBm
	34 GHz ≤ f ≤ 40 GHz	< –133 dBm, typ. –136 dBm

Displayed average noise level with R&S®FSV-B22 preamplifier option		
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 5 Hz, VBW = 5 Hz, zero span, sweep time 500 ms, sample detector, trace average, sweep count = 20, mean marker, RF preamplifier = OFF	
	10 Hz	< –90 dBm (nom.)
	20 Hz	< –100 dBm, typ. –110 dBm
	100 Hz	< –110 dBm, typ. –120 dBm
	1 kHz	< –120 dBm, typ. –130 dBm
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 3 kHz, zero span, sweep time 50 ms, sample detector, trace average, sweep count = 20, mean marker, RF preamplifier = OFF	
	R&S®FSVR7	
	9 kHz ≤ f < 100 kHz	< –130 dBm, typ. –140 dBm
	100 kHz ≤ f < 1 MHz	< –145 dBm, typ. –150 dBm
	1 MHz ≤ f < 1 GHz	< –152 dBm, typ. –155 dBm
	1 GHz ≤ f < 3.6 GHz	< –150 dBm, typ. –153 dBm
	3.6 GHz ≤ f < 6 GHz	< –148 dBm, typ. –151 dBm
	6 GHz ≤ f ≤ 7 GHz	< –146 dBm, typ. –149 dBm
	R&S®FSVR13, R&S®FSVR30	
	9 kHz ≤ f < 100 kHz	< –130 dBm, typ. –140 dBm
	100 kHz ≤ f < 1 MHz	< –145 dBm, typ. –150 dBm
	1 MHz ≤ f < 1 GHz	< –151 dBm, typ. –154 dBm
	1 GHz ≤ f < 3.6 GHz	< –149 dBm, typ. –152 dBm
	3.6 GHz ≤ f < 6 GHz	< –146 dBm, typ. –149 dBm
	6 GHz ≤ f < 7.4 GHz	< –144 dBm, typ. –147 dBm
	7.4 GHz ≤ f < 15 GHz	< –147 dBm, typ. –150 dBm
	15 GHz ≤ f ≤ 30 GHz	< –142 dBm, typ. –145 dBm
	R&S®FSVR40	
	9 kHz ≤ f < 100 kHz	< –130 dBm, typ. –140 dBm
	100 kHz ≤ f < 1 MHz	< –145 dBm, typ. –150 dBm
	1 MHz ≤ f < 1 GHz	< –151 dBm, typ. –154 dBm
	1 GHz ≤ f < 3.6 GHz	< –149 dBm, typ. –152 dBm
	3.6 GHz ≤ f < 6 GHz	< –146 dBm, typ. –149 dBm
	6 GHz ≤ f < 7.4 GHz	< –144 dBm, typ. –147 dBm
	7.4 GHz ≤ f < 15 GHz	< –144 dBm, typ. –147 dBm
	15 GHz ≤ f < 34 GHz	< –140 dBm, typ. –143 dBm
	34 GHz ≤ f ≤ 40 GHz	< –133 dBm, typ. –136 dBm
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 3 kHz, zero span, sweep time 50 ms, sample detector, trace average, sweep count = 20, mean marker, RF preamplifier = ON	
	R&S®FSVR7	
	100 kHz ≤ f < 1 MHz	< –150 dBm, typ. –155 dBm
	1 MHz ≤ f < 1 GHz	< –162 dBm, typ. –165 dBm
	1 GHz ≤ f < 3.6 GHz	< –160 dBm, typ. –163 dBm
	3.6 GHz ≤ f < 6 GHz	< –158 dBm, typ. –161 dBm
	6 GHz ≤ f ≤ 7 GHz	< –156 dBm, typ. –159 dBm
	R&S®FSVR13, R&S®FSVR30, R&S®FSVR40	
	100 kHz ≤ f < 1 MHz	< –145 dBm, typ. –148 dBm
	1 MHz ≤ f < 20 MHz	< –155 dBm, typ. –158 dBm
	20 MHz ≤ f < 1 GHz	< –160 dBm, typ. –163 dBm
	1 GHz ≤ f < 3.6 GHz	< –159 dBm, typ. –162 dBm
	3.6 GHz ≤ f < 6 GHz	< –156 dBm, typ. –159 dBm
	6 GHz ≤ f ≤ 7 GHz	< –154 dBm, typ. –157 dBm

Displayed average noise level with R&S®FSV-B24 preamplifier option		
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 5 Hz, VBW = 5 Hz, zero span, sweep time 500 ms, sample detector, trace average, sweep count = 20, mean marker, RF preamplifier = OFF	
	10 Hz	< –90 dBm (nom.)
	20 Hz	< –100 dBm, typ. –110 dBm
	100 Hz	< –110 dBm, typ. –120 dBm
	1 kHz	< –120 dBm, typ. –130 dBm
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 3 kHz, zero span, sweep time 50 ms, sample detector, trace average, sweep count = 20, mean marker, RF preamplifier = OFF	
	R&S®FSVR13, R&S®FSVR30	
	9 kHz ≤ f < 100 kHz	< –130 dBm, typ. –140 dBm
	100 kHz ≤ f < 1 MHz	< –145 dBm, typ. –150 dBm
	1 MHz ≤ f < 1 GHz	< –150 dBm, typ. –153 dBm
	1 GHz ≤ f < 3.6 GHz	< –147 dBm, typ. –150 dBm
	3.6 GHz ≤ f < 6 GHz	< –144 dBm, typ. –147 dBm
	6 GHz ≤ f < 7.4 GHz	< –141 dBm, typ. –144 dBm
	7.4 GHz ≤ f < 13.6 GHz	< –144 dBm, typ. –147 dBm
	13.6 GHz ≤ f < 15 GHz	< –142 dBm, typ. –145 dBm
	15 GHz ≤ f ≤ 30 GHz	< –139 dBm, typ. –142 dBm
	R&S®FSVR40	
	9 kHz ≤ f < 100 kHz	< –130 dBm, typ. –140 dBm
	100 kHz ≤ f < 1 MHz	< –145 dBm, typ. –150 dBm
	1 MHz ≤ f < 1 GHz	< –150 dBm, typ. –153 dBm
	1 GHz ≤ f < 3.6 GHz	< –147 dBm, typ. –150 dBm
	3.6 GHz ≤ f < 6 GHz	< –144 dBm, typ. –147 dBm
	6 GHz ≤ f < 7.4 GHz	< –141 dBm, typ. –144 dBm
	7.4 GHz ≤ f < 13.6 GHz	< –142 dBm, typ. –145 dBm
	13.6 GHz ≤ f < 15 GHz	< –140 dBm, typ. –143 dBm
	15 GHz ≤ f < 34 GHz	< –137 dBm, typ. –140 dBm
	34 GHz ≤ f ≤ 40 GHz	< –129 dBm, typ. –132 dBm
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 3 kHz, zero span, sweep time 50 ms, sample detector, trace average, sweep count = 20, mean marker, RF preamplifier = ON, YIG preselector = ON	
	R&S®FSVR13, R&S®FSVR30, R&S®FSVR40	
	100 kHz ≤ f < 1 MHz	< –145 dBm, typ. –148 dBm
	1 MHz ≤ f < 20 MHz	< –155 dBm, typ. –158 dBm
	20 MHz ≤ f < 1 GHz	< –160 dBm, typ. –163 dBm
	1 GHz ≤ f < 3.6 GHz	< –157 dBm, typ. –160 dBm
	3.6 GHz ≤ f < 6 GHz	< –153 dBm, typ. –156 dBm
	6 GHz ≤ f ≤ 7.4 GHz	< –150 dBm, typ. –153 dBm
	7.4 GHz ≤ f < 15 GHz	< –164 dBm, typ. –167 dBm
	15 GHz ≤ f < 34 GHz	< –159 dBm, typ. –162 dBm
	34 GHz ≤ f ≤ 40 GHz	< –153 dBm, typ. –155 dBm
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 3 kHz, zero span, sweep time 50 ms, sample detector, trace average, sweep count = 20, mean marker, RF preamplifier = ON, YIG preselector = OFF	
	R&S®FSVR13, R&S®FSVR30, R&S®FSVR40	
	100 kHz ≤ f < 1 MHz	< –145 dBm, typ. –148 dBm
	1 MHz ≤ f < 20 MHz	< –155 dBm, typ. –158 dBm
	20 MHz ≤ f < 1 GHz	< –160 dBm, typ. –163 dBm
	1 GHz ≤ f < 3.6 GHz	< –157 dBm, typ. –160 dBm
	3.6 GHz ≤ f < 6 GHz	< –153 dBm, typ. –156 dBm
	6 GHz ≤ f < 7 GHz	< –150 dBm, typ. –153 dBm
	7 GHz ≤ f < 7.4 GHz	< –146 dBm, typ. –149 dBm
	7.4 GHz ≤ f < 15 GHz	< –160 dBm, typ. –163 dBm
	15 GHz ≤ f < 34 GHz	< –155 dBm, typ. –158 dBm
	34 GHz ≤ f ≤ 40 GHz	< –148 dBm, typ. –150 dBm

Spurious responses	YIG preselector = ON for f ≥ 7 GHz	
Image response	20 MHz ≤ f ≤ 7 GHz	
	f_{in} – 2 × 8409.9 MHz (1st IF)	< –80 dBc (nom.)
	f_{in} – 2 × 729.9 MHz (2nd IF)	< –80 dBc
	f_{in} – 2 × 89.9 MHz (3rd IF)	< –80 dBc
	7 GHz < f < 30 GHz	
	f_{in} ± 2 × 729.9 MHz (1st IF)	< –80 dBc
	f_{in} – 2 × 89.9 MHz (2nd IF)	< –80 dBc
	30 GHz ≤ f ≤ 40 GHz	
	f_{in} ± 2 × 729.9 MHz (1st IF)	< –70 dBc
	f_{in} – 2 × 89.9 MHz (2nd IF)	< –80 dBc
Intermediate frequency response	20 MHz ≤ f ≤ 7 GHz	
	1st IF (8409.9 MHz)	< –70 dBc (nom.)
	2nd IF (729.9 MHz)	< –80 dBc
	3rd IF (89.9 MHz)	< –80 dBc
	7 GHz < f ≤ 40 GHz	
	1st IF (729.9 MHz)	< –80 dBc
	2nd IF (89.9 MHz)	< –80 dBc
Residual spurious response	0 dB RF attenuation	
	f ≤ 1 MHz	< –90 dBm
	f > 1 MHz	< –103 dBm
Local oscillator related spurious	f < 15 GHz	
	1 kHz ≤ offset from carrier ≤ 10 MHz	< –70 dBc
	offset from carrier > 10 MHz	< –80 dBc
	15 GHz ≤ f < 30 GHz	
	1 kHz ≤ offset from carrier ≤ 10 MHz	< –64 dBc
	offset from carrier > 10 MHz	< –74 dBc
	30 GHz ≤ f ≤ 40 GHz	
	1 kHz ≤ offset from carrier ≤ 10 MHz	< –58 dBc
	offset from carrier > 10 MHz	< –68 dBc
Other interfering signals		
Subharmonic of 1st LO	20 MHz ≤ f < 7 GHz, spurious at 8410 MHz – 2 × f_{in}	< –70 dBc
Harmonic of 1st LO	mixer level < –25 dBm, spurious at f_{in} –4205 MHz	< –70 dBc

Level display		
Logarithmic level axis		1 dB to 200 dB, in steps of 1/2/5
Linear level axis		10 % of reference level per level division, 10 divisions or logarithmic scaling
Number of traces		6
Trace detector		Max Peak, Min Peak, Auto Peak (Normal), Sample, RMS, Average
Trace functions		Clear/Write, Max Hold, Min Hold, Average, View
Setting range of reference level		–130 dBm to (–10 dBm + RF attenuation – RF preamplifier gain), in steps of 0.01 dB
Units of level axis	logarithmic level display	dBm, dBµV, dBmV, dBµA, dBpW
	linear level display	µV, mV, µA, mA, pW, nW

Spectrogram display		
Result display		color-graded bitmap
Spectrogram bitmap color depth		240 colors
Dynamic range covered by bitmap colors		selectable, up to 200 dB (nom.)
History depth		max. 100000 frames [4]
Recording mode		single trace, continuous, frame count
Trace detector		Max Peak, Min Peak, Sample, RMS, Average
Number of markers		16
Marker readout		frequency, time/frame number, level

Level measurement uncertainty		
Absolute level uncertainty at 64 MHz	RBW = 10 kHz, level –10 dBm, reference level –10 dBm, RF attenuation 10 dB	
	+20 °C to +30 °C	< 0.2 dB (σ = 0.07 dB)
	+5 °C to +40 °C	< 0.35 dB (σ = 0.12 dB)
Frequency response referenced to 64 MHz	DC coupling, RF attenuation 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier = OFF, +20 °C to +30 °C	
	9 kHz ≤ f < 10 MHz	< 0.5 dB (σ = 0.17 dB)
	10 MHz ≤ f < 3.6 GHz	< 0.3 dB (σ = 0.1 dB)
	3.6 GHz ≤ f < 7 GHz	< 0.5 dB (σ = 0.17 dB)
	7 GHz ≤ f < 13.6 GHz, span < 1 GHz	< 1.5 dB (σ = 0.5 dB)
	13.6 GHz ≤ f < 30 GHz, span < 1 GHz	< 2 dB (σ = 0.66 dB)
	30 GHz ≤ f ≤ 40 GHz, span < 1 GHz	< 2.5 dB (σ = 0.83 dB)
	any setting of RF attenuation, RF preamplifier = OFF, +5 °C to +40 °C	
	9 kHz ≤ f < 3.6 GHz	< 1 dB (σ = 0.33 dB)
	3.6 GHz ≤ f < 7 GHz	< 1.5 dB (σ = 0.5 dB)
	7 GHz ≤ f < 13.6 GHz	< 2.5 dB (σ = 0.83 dB)
	13.6 GHz ≤ f < 26.5 GHz	< 3 dB (σ = 1 dB)
	26.5 GHz ≤ f < 30 GHz	< 3.5 dB (σ = 1.17 dB)
	30 GHz ≤ f ≤ 40 GHz	< 4 dB (σ = 1.34)
	any setting of RF attenuation, RF preamplifier = ON, +5 °C to +40 °C	
	9 kHz ≤ f < 3.6 GHz	< 1 dB (σ = 0.33 dB)
	3.6 GHz ≤ f < 7 GHz	< 1.5 dB (σ = 0.5 dB)
	7 GHz ≤ f < 13.6 GHz	< 3 dB (σ = 1 dB)
	13.6 GHz ≤ f < 30 GHz	< 3.5 dB (σ = 1.17 dB)
	30 GHz ≤ f ≤ 40 GHz	< 4.5 dB (σ = 1.5 dB)
	DC coupling, RF preamplifier = OFF, +5 °C to +40 °C	
	10 Hz ≤ f < 20 Hz	< 1.5 dB (nom.)
	20 Hz ≤ f < 9 kHz	< 1 dB (σ = 0.33 dB)
Attenuator switching uncertainty	f = 64 MHz, 0 dB to 70 dB, referenced to 10 dB attenuation	< 0.2 dB (σ = 0.07 dB)
Uncertainty of reference level setting		0 dB [5] (nom.)
Bandwidth switching uncertainty	referenced to RBW = 10 kHz	
	sweep filters	< 0.1 dB (σ = 0.04 dB)
	FFT filters	< 0.2 dB (σ = 0.07 dB)

[4] A frame is the measurement result displayed in one row of the spectrogram. It may consist of one or more traces, depending on the set sweep count. For example, a sweep count of 2 means that two traces will be combined to one row in the spectrogram using the set trace detector.

[5] The setting of the reference level affects only the graphical representation of the measurement result on the display, not the measurement itself. Therefore, the reference level setting causes no additional uncertainty in measurement results.

Display nonlinearity		
Logarithmic level display	S/N > 16 dB	
	0 dB to –50 dB	< 0.1 dB (σ = 0.04 dB)
	–50 dB to –60 dB	< 0.15 dB (σ = 0.05 dB)
	–60 dB to –70 dB	< 0.2 dB (σ = 0.07 dB)
Linear level display	S/N > 16 dB, 0 dB to –70 dB	< 5 % of reference level (nom.)

Total measurement uncertainty		
	signal level 0 dB to –70 dB below reference level, S/N > 20 dB, sweep time auto, sweep type = sweep, RF attenuation 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier = OFF, span/RBW < 100, 95 % confidence level, +20 °C to +30 °C	
	9 kHz ≤ f < 10 MHz	±0.40 dB
	10 MHz ≤ f < 3.6 GHz	±0.31 dB
	3.6 GHz ≤ f < 7 GHz	±0.40 dB
	7 GHz ≤ f < 13.6 GHz	±1.01 dB
	13.6 GHz ≤ f < 30 GHz	±1.33 dB
	30 GHz ≤ f ≤ 40 GHz	±1.65 dB

Measurement speed

Local measurement and display update rate		1.1 ms (900/s) (meas.)
Remote measurement, 1000 sweep averages [6]		1 ms (1000/s) (meas.)
Remote measurement and LAN transfer [6]		3 ms (333/s) (meas.)
Marker peak search		1.5 ms (meas.)
Center frequency tune and transfer [6]	f ≤ 7 GHz	15 ms (meas.)
	f > 7 GHz	28 ms (meas.)

Trigger functions

Trigger		
Trigger source		free run, video, external, IF power
Trigger offset	span ≥ 10 Hz	31.25 ns to 30 s, min. resolution 31.25 ns (or 1 % of offset)
	span = 0 Hz	(–sweep time) to 30 s, min. resolution 31.25 ns (or 1 % of offset)
Max. deviation of trigger offset		±(7.8125 ns + (0.1 % × trigger offset))
IF power trigger		
Sensitivity	min. signal power	–60 dBm + RF attenuation – RF pre-amplifier gain (nom.)
	max. signal power	–10 dBm + RF attenuation – RF pre-amplifier gain (nom.)
IF power trigger bandwidth	RBW > 500 kHz, swept	40 MHz (nom.)
	RBW > 20 kHz, FFT	
	RBW ≤ 500 kHz, swept	6 MHz (nom.)
	RBW ≤ 20 kHz, FFT	
Gated sweep		
Gate source		video, external, IF power
Gate delay		31.25 ns to 30 s, min. resolution 31.25 ns (or 1 % of delay)
Gate length		31.25 ns to 30 s, min. resolution 31.25 ns (or 1 % of gate length)
Max. deviation of gate length		±(7.8125 ns + (0.1 % × gate length))

I/Q data

Interface		GPIB or LAN interface
Memory length		max. 200 Msample I and Q
Word length of I/Q samples	sampling rate > 64 MHz or number of samples > 100 Msample	18 bit
	otherwise	24 bit
Sampling rate		100 Hz to 128 MHz
Max. signal bandwidth (equalized)	f ≤ 7 GHz	40 MHz
	f > 7 GHz, YIG preselector = OFF	40 MHz
Amplitude flatness	(1.25 × signal analysis bandwidth) ≤ f_{center} ≤ 7 GHz	±0.3 dB (nom.)
	f > 7 GHz, YIG preselector = OFF	±0.5 dB (nom.)
Deviation from linear phase	(1.25 × signal analysis bandwidth) ≤ f_{center} ≤ 7 GHz	±1° (nom.)
	f > 7 GHz, YIG preselector = OFF	±2° (nom.)

[6] Measured with personal computer equipped with Intel Core2 Duo 2.13 GHz and Gbit LAN interface.

Real-time spectrum analyzer mode

The specifications of the real-time spectrum analyzer mode are based on the specifications of the signal and spectrum analyzer mode. Therefore these specifications apply also for the real-time spectrum analyzer mode unless otherwise noted.
For frequencies > 7 GHz, the specifications for YIG preselector = OFF apply.

Span		
Range		100 Hz to 40 MHz
Resolution		1 Hz

Frequency readout		
Number of sweep (trace) points		801
Marker resolution		0.01 Hz
Uncertainty		±(marker frequency × reference uncertainty + 10 % × resolution bandwidth + ½ (span/(sweep points –1)) + 1 Hz)
Marker tuning frequency step size		span/800

Sweep time		
Range	real-time spectrum, real-time spectrogram, free run or stop on trigger	52 µs to 1 s [7]
	auto rearm trigger	4 µs to 1 s
Resolution		4 µs

Data acquisition		
A/D converter		
Sampling rate		128 Msample/s
Resolution		16 bit
FFT length		1024
FFT window		Blackman Harris, Flattop, Gaussian, Rectangular, Hanning, Kaiser
FFT overlap factor		≥ 80 %
Spectrum (FFT) processing rate	span = 40 MHz	250000/s
Minimum detectable signal duration	span = 40 MHz, SNR > 60 dB	25 ns (nom.)

Resolution bandwidth (–3 dB)		
Range		1 Hz to 400 kHz, fixed span/RBW ratio, dependent on selected FFT window
Span/RBW ratio	selected FFT window	
	Blackman Harris (default)	200
	Flattop	100
	Gaussian	200
	Rectangular	400
	Hanning	250
	Kaiser	200
Bandwidth uncertainty		< 3 % (nom.)

Video bandwidths		none

Channel bandwidths		none

[7] Time period during which individual FFTs contribute to the results of the selected trace detector.

Level

Amplitude flatness	(1.25 × signal analysis bandwidth) ≤ f_{center} ≤ 7 GHz	±0.8 dB (nom.)
	f > 7 GHz	±1 dB (nom.)

Spurious free dynamic range	span = 40 MHz	< –70 dBc (nom.)

Minimum signal duration necessary for specified level measurement uncertainty [8]	trace detector = Max Peak, span =	nominal values
	40 MHz	24 µs
	20 MHz	45 µs
	10 MHz	86 µs
	5 MHz	168 µs
	2 MHz	414 µs
	1 MHz	824 µs
	500 kHz	1.7 ms
	200 kHz	4.1 ms
	100 kHz	8.2 ms
	50 kHz	16.4 ms
	20 kHz	41 ms
	10 kHz	82 ms
	5 kHz	164 ms
	2 kHz	410 ms
	1 kHz	820 ms
	500 Hz	1.64 s
	200 Hz	4.1 s
	100 Hz	8.2 s

Result display

Display modes		full screen, split screen
Max. number of screens	display mode = split screen	4
Result display types	with or without active frequency mask trigger + any combination if display mode = split screen	real-time spectrum, persistence spectrum, real-time spectrogram, power vs. time, power vs. time waterfall [9]

Real-time spectrum		
Number of traces		4
Trace detector		Max Peak, Min Peak, Sample, Average
Trace functions		Clear/Write, Max Hold, Min Hold, View
Number of markers		16
Marker readout		frequency, level
Maximum sweep update rate [10]		10000/s

Persistence spectrum		
Persistence bitmap resolution		801 × 600 points
Persistence bitmap color depth		256 colors
Probability range covered by bitmap colors		selectable, 0 % to 100 %
Persistence duration		0 s to 8 s
Persistence max hold transparency	overlaying display of the maximum level values reached	0 % to 100 % in 1 % steps
Number of markers		16
Marker readout		frequency, level, hit probability
Number of real-time traces	in addition to persistence spectrum display	1
Real-time trace detector		Max Peak, Min Peak, Sample, Average
Real-time trace functions		Clear/Write, Max Hold, Min Hold, View

[8] Events lasting shorter than the minimum event duration specification will result in degraded level accuracy.

[9] Requires firmware version 1.56 or higher.

[10] Sweep update rate includes FFT overlap and trace detector processing.

Spectrogram		
Result display		color-graded bitmap
Spectrogram bitmap color depth		240 colors
Dynamic range covered by bitmap colors		selectable, up to 200 dB (nom.)
History depth		max. 100000 frames [11]
Recording mode		single trace, continuous, frame count
Trace detector		Max Peak, Min Peak, Sample
Number of markers		16
Marker readout		frequency, time/frame number, level
Maximum sweep update rate [12]		10000/s

Power vs. time [9]		
Number of traces		4
Trace detector		Max Peak, Min Peak, Sample, Average
Trace functions		Clear/Write, View
Number of markers		16
Marker readout		time, level
Maximum sweep update rate		1250/s

Power vs. time waterfall [9]		
Result display		color-graded bitmap
Spectrogram bitmap color depth		240 colors
Dynamic range covered by bitmap colors		selectable, up to 200 dB (nom.)
History depth		max. 100000 frames [11]
Recording mode		single trace, continuous, frame count
Number of markers		16
Marker readout		time, time/frame number, level
Maximum sweep update rate [12]		1250/s

I/Q data [9]

Interface		GPIB or LAN interface
Memory length		max. 200 Msample I and Q
Word length of I/Q samples	sampling rate > 64 MHz or number of samples > 100 Msample	18 bit
	otherwise	24 bit
Sampling rate		100 Hz to 128 MHz
Max. signal bandwidth (equalized)	f ≤ 7 GHz	40 MHz
	f > 7 GHz, YIG preselector = OFF	40 MHz
Amplitude flatness	(1.25 × signal analysis bandwidth) ≤ f_{center} ≤ 7 GHz	±0.3 dB (nom.)
	f > 7 GHz, YIG preselector = OFF	±0.5 dB (nom.)
Deviation from linear phase	(1.25 × signal analysis bandwidth) ≤ f_{center} ≤ 7 GHz	±1° (nom.)
	f > 7 GHz, YIG preselector = OFF	±2° (nom.)

[11] A frame is the measurement result displayed in one row of the spectrogram. It may consist of one or more traces, depending on the set sweep count. For example, a sweep count of 2 means that two traces will be combined to one row in the spectrogram using the set trace detector.

[12] Sweep update rate includes FFT overlap and trace detector processing.

Trigger

Trigger source		free run, frequency mask, time domain trigger, external

Frequency mask trigger		
Trigger level resolution		0.5 dB
Minimum necessary mask distance to noise floor		30 dB (nom.)
Dynamic range	frequency mask – reference level	0 dB to –80 dB (nom.)
Trigger level accuracy	frequency mask > reference level – 50 dB	±(frequency response + 1.0 dB) (nom.)
	frequency mask > reference level – 70 dB	±(frequency response + 2.5 dB) (nom.)
Trigger uncertainty	span = 40 MHz	±12 µs (nom.)
Trigger conditions		enter mask area, leave mask area
Trigger modes		auto rearm trigger, stop on trigger
Trigger mask		
Mask length		3 to 801 frequency points
Mask frequency resolution		span/800
Mask shape generation		manual, auto set (mask derived from the measured spectrum)
Minimum signal duration for 100 % probability of trigger (nominal values) [13]		see minimum signal duration necessary for specified level measurement uncertainty

Trigger out	with R&S®FSV-B5 option	
Connector		BNC female
Output		TTL-compatible, 0 V/5 V (nom.)

[13] Events lasting shorter than the minimum event duration specification will result in degraded frequency mask trigger accuracy.

Inputs and outputs

RF input		
Impedance		50 Ω
Connector	R&S®FSVR7, R&S®FSVR13	N female
	R&S®FSVR30	test port adapter APC 3.5 mm/N female
	R&S®FSVR40	test port adapter 2.92 mm (K)/N female
VSWR	RF attenuation ≥ 10 dB	
	10 MHz ≤ f < 3.6 GHz	< 1.5, typ.1.3
	3.6 GHz ≤ f < 20 GHz	< 2, typ. 1.8
	20 GHz ≤ f < 27 GHz	< 2.2, typ. 2
	27 GHz ≤ f < 30 GHz	
	DC-coupled	< 2.2, typ. 2
	AC-coupled	2.5 (meas.)
	30 GHz ≤ f ≤ 40 GHz	
	DC-coupled	< 2.5, typ. 2.2
	AC-coupled	3 (meas.)
	RF attenuation < 10 dB, DC-coupled	
	10 MHz ≤ f < 7 GHz	2 (meas.)
	7 GHz ≤ f < 30 GHz	2.5 (meas.)
	30 GHz ≤ f ≤ 40 GHz	3 (meas.)
Setting range of attenuator	standard	0 dB to 75 dB, in 5 dB steps
	with R&S®FSV-B25 option	0 dB to 75 dB, in 1 dB steps
Setting range of electronic attenuator	with R&S®FSV-B25 option, f ≤ 7 GHz	0 dB to 25 dB, in 1 dB steps
	with R&S®FSV-B25 option, f > 7 GHz	0 dB to 9 dB, in 1 dB steps
RF preamplifier gain	with R&S®FSV-B22 option	20 dB (nom.)
	with R&S®FSV-B24 option	
	f ≤ 7 GHz	20 dB (nom.)
	f > 7 GHz	30 dB (nom.)

Probe power supply		
Supply voltages		+15 V DC, –12.6 V DC and ground, max. 150 mA (nom.)

Noise source drive		
Connector		BNC female
Output voltage		0 V/28 V, max. 100 mA, switchable (nom.)

Power sensor		
Connector		6-pin LEMOSA female for supported R&S®NRP-Zxx power sensors

USB interface		2 ports, type A plug, version 2.0

Reference output		
Connector		BNC female
Impedance		50 Ω (nom.)
Output frequency	internal reference	10 MHz
	external reference	same as reference input signal
Level		> 0 dBm (nom.)

Reference input		
Connector		BNC female
Impedance		50 Ω (nom.)
Input frequency range		1 MHz ≤ f_{in} ≤ 20 MHz, in 100 kHz steps
Required level		> 0 dBm into 50 Ω (nom.)

External trigger/gate input		
Connector		BNC female
Trigger voltage		0.5 V to 3.5 V (nom.)
Input impedance		10 kΩ (nom.)

IEC/IEEE bus control		interface in line with IEC 625-2 (IEEE 488.2)
Command set		SCPI 1997.0
Connector		24-pin Amphenol female
Interface functions		SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT1, C0

LAN interface		10/100/1000BaseT
Connector		RJ-45

External monitor		
Connector		VGA-compatible, 15-pin, mini D-Sub

General data

Display		21 cm LC TFT color display (8.4")
Resolution		800 × 600 pixel (SVGA resolution)
Pixel failure rate		< 1 × 10^{-5}

Data storage		
Internal	standard	hard disk ≥ 40 Gbyte
	with R&S®FSVR-B18 option	solid state disk ≥ 8 Gbyte
External		supports USB-2.0-compatible memory devices

Temperature		
Temperature	operating temperature range	+5 °C to +40 °C
	permissible temperature range	0 °C to +50 °C
	storage temperature range	–40 °C to +70 °C
Climatic loading		+40 °C at 90 % rel. humidity, in line with EN 60068-2-30

Mechanical resistance		
Vibration	sinusoidal	5 Hz to 150 Hz, max. 2 g at 55 Hz; 0.5 g from 55 Hz to 150 Hz; in line with EN 60068-2-6
	random	10 Hz to 130 Hz, acceleration 1.2 g (rms), in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-T-28800F, class 3, MIL-STD 810E, method 516.4, procedure I

EMC		in line with EMC Directive 2004/108/EC including: IEC/EN 61326-1 [14, 15] IEC/EN 61326-2-1 CISPR 11/EN 55011 [15] IEC/EN 61000-3-2 IEC/EN 61000-3-3

Recommended calibration interval		1 year

Power supply		
AC input voltage range		100 V to 240 V, ±10 % (nom.)
AC supply frequency		50 Hz to 400 Hz, +10 %/–6% (nom.)
Max. input current		5.2 A (100 V) to 2.2 A (240 V) (nom.)
Power consumption	R&S®FSVR7	150 W, max. 250 W with all options (meas.)
	R&S®FSVR13, R&S®FSVR30, R&S®FSVR40	175 W, max. 250 W with all options (meas.)
Safety		in line with IEC 61010-1, EN 61010-1, CAN/CSA-C22.2 No. 61010-1-04, UL 61010-1
Test mark		VDE-GS, $_{C}$CSA$_{US}$

[14] Emission limits for class A equipment.

[15] Immunity test requirement for industrial environment (EN 61326 table 2).

Weight and dimensions		
Dimensions (nom.)	W × H × D	412 mm × 197 mm × 517 mm 16.22 in × 7.76 in × 20.35 in
Net weight without options (nom.)	R&S®FSVR7	12.8 kg 28.22 lb
	R&S®FSVR13	13.6 kg 29.98 lb
	R&S®FSVR30	14.0 kg 30.86 lb
	R&S®FSVR40	14.3 kg 31.52 lb

Options

R&S®FSV-B3 audio demodulator

Demodulation		
AF demodulation types		AM and FM
Audio output		loudspeaker and phone jack
Marker stop time in spectrum mode		100 ms to 60 s

AF output		
Connector		3.5 mm mini jack
Output impedance		10 Ω (nom.)
Open-circuit voltage		up to 1.5 V, adjustable

R&S®FSV-B5 additional interfaces

User port		
Connector		9-pin D-Sub male
Output		TTL-compatible, 0 V/5 V (nom.), max. 15 mA (nom.)
Input		TTL-compatible, max. 5 V (nom.)

IF/video/demod out		
Connector		BNC female, 50 Ω (nom.)
IF out		
Bandwidth		equal to RBW setting
IF frequency		32 MHz (nom.)
Output level (gain versus RF input)	RF attenuation 0 dB, RF preamplifier OFF, span 0 Hz	0 dB (nom.)
Video out		
Bandwidth		equal to VBW setting
Output scaling	log. display scale	logarithmic
	lin. display scale	linear
Output level	center frequency > 10 MHz, span 0 Hz, signal at reference level and center frequency	1 V, open circuit (nom.)

Trigger out		
Connector		BNC female
Output		TTL-compatible, 0 V/5 V (nom.)

USB interface		2 ports, type A plug, version 2.0

R&S®FSV-B17 digital baseband interface [9]

I/Q data IN		
Connector		26-pin female mini D ribbon connector
Data lines	number of data lines (differential lines)	8
	bit rate (on each data line)	396 MHz to 600 MHz
	level	LVDS
Clock	clock rate	66 MHz to 100 MHz
	level	LVDS
Communications lines		bidirectional 2-wire interface
	level	3.3 V
I/Q data OUT		
Connector		26-pin female mini D ribbon connector
Data lines	number of data lines (differential lines)	8
	bit rate (on each data line)	600 MHz
	level	LVDS
Clock	clock rate	100 MHz
	level	LVDS
Communications lines		bidirectional 2-wire interface
	level	3.3 V

R&S®FSV-B21 LO/IF ports for external mixers (for R&S®FSVR30 and R&S®FSVR40 only)

LO signal		
Frequency range		7.73 GHz to 15.23 GHz
Level	+20 °C to +30 °C	+15.5 dBm ± 1 dB
	+5 °C to +40 °C	+15.5 dBm ± 3 dB

IF input		
IF frequency		729.9 MHz
Full-scale level	2-port mixer (LO output/IF input, front panel)	–20 dBm
	3-port mixer (IF input, front panel)	–20 dBm
Level uncertainty	IF input level –30 dBm, RBW 30 kHz, 2-port mixer, LO output/IF input (front panel)	
	+20 °C to +30 °C	< 1 dB
	+5 °C to +40 °C	< 3 dB
	IF input level –30 dBm, RBW 30 kHz, 3-port mixer, IF input (front panel)	
	+20 °C to +30 °C	< 1 dB
	+5 °C to +40 °C	< 3 dB

Inputs and outputs		
LO output/IF input		SMA female, 50 Ω
IF input		SMA female, 50 Ω

Ordering information

Designation	Type	Order No.
Real-Time Spectrum Analyzer	R&S®FSVR7	1311.0006.07
Real-Time Spectrum Analyzer	R&S®FSVR13	1311.0006.13
Real-Time Spectrum Analyzer	R&S®FSVR30	1311.0006.30
Real-Time Spectrum Analyzer	R&S®FSVR40	1311.0006.40
Accessories supplied		
Power cable, quick start guide and CD-ROM (with operating manual and service manual) R&S®FSVR30: test port adapter with 3.5 mm female (1021.0512.00) and N female (1021.0535.00) connectors R&S®FSVR40: test port adapter with 2.92 mm (K) female (1036.4790.00) and N female (1036.4777.00) connectors		

Options

Designation	Type	Order No.	Retrofittable	Remarks
Audio Demodulator	R&S®FSV-B3	1310.9516.02	yes	retrofit in service center
OCXO Reference Frequency	R&S®FSV-B4	1310.9522.02	yes	user-retrofittable
OCXO Extended Frequency Stability	R&S®FSV-B4	1310.9522.03	yes	user-retrofittable
Additional Interfaces	R&S®FSV-B5	1310.9539.02	yes	IF out, video out, AUX port, trigger out, 2 × USB
Digital Baseband Interface	R&S®FSV-B17	1310.9568.02	yes	user-retrofittable, for details ask service center
Solid State Drive (removable hard drive)	R&S®FSVR-B18	1310.9697.04	yes	user-retrofittable
Spare Hard Drive (removable hard drive)	R&S®FSVR-B19	1310.9574.04	yes	user-retrofittable
LO/IF Ports for External Mixers	R&S®FSV-B21	1310.9597.02	no	R&S®FSVR30 and R&S®FSVR40 only
RF Preamplifier (9 kHz to 7 GHz)	R&S®FSV-B22	1310.9600.02	yes	user-retrofittable
RF Preamplifier (9 kHz to 13.6 GHz)	R&S®FSV-B24	1310.9616.13	no	
RF Preamplifier (9 kHz to 30 GHz)	R&S®FSV-B24	1310.9616.30	no	
RF Preamplifier (9 kHz to 40 GHz)	R&S®FSV-B24	1310.9616.40	no	
Electronic Attenuator, 1 dB steps	R&S®FSV-B25	1310.9622.02	yes	user-retrofittable
Firmware/software				
FM Stereo Measurements	R&S®FSV-K7S	1310.8126.02		
Bluetooth®/EDR Measurements	R&S®FSV-K8	1310.8155.02		
Power Sensor Measurement with R&S®NRP Power Sensors	R&S®FSV-K9	1310.8203.02		supports R&S®NRP-Zxx power sensors
Analysis of GSM, EDGE and EDGE Evolution Signals	R&S®FSV-K10	1310.8055.02		
Noise Figure and Gain Measurements	R&S®FSV-K30	1310.8355.02		
Phase Noise Measurement Application	R&S®FSV-K40	1310.8403.02		
Vector Signal Analysis	R&S®FSV-K70	1310.8455.02		
Analysis of 3GPP FDD Base Station Signals incl. HSPA+	R&S®FSV-K72	1310.8503.02		
3GPP FDD UE Analysis incl. HSPA+	R&S®FSV-K73	1310.8555.02		
3GGP TD-SCDMA BTS Measurements	R&S®FSV-K76	1310.8603.02		
TD-SCDMA UE Measurements	R&S®FSV-K77	1310.8655.02		
Analysis of CDMA2000® Base Station Signals	R&S®FSV-K82	1310.8703.02		
CDMA2000® MS Measurements	R&S®FSV-K83	1310.8755.02		
Analysis of 1xEV-DO Base Station Signals	R&S®FSV-K84	1310.8803.02		
1xEV-DO MS Measurements	R&S®FSV-K85	1310.8778.02		
Analysis of WLAN 802.11a, b, g, j Signals	R&S®FSV-K91	1310.8903.02		
Extension of R&S®FSV-K91 to 802.11n	R&S®FSV-K91n	1310.9468.02		
Analysis of WiMAX™ 802.16 SISO Signals	R&S®FSV-K93	1310.8955.02		
Analysis of EUTRA/LTE FDD Downlink Signals	R&S®FSV-K100	1310.9051.02		
Analysis of EUTRA/LTE FDD Uplink Signals	R&S®FSV-K101	1310.9100.02		
EUTRA/LTE Downlink MIMO Measurements	R&S®FSV-K102	1310.9151.02		
Analysis of EUTRA/LTE TDD Downlink Signals	R&S®FSV-K104	1309.9774.02		
Analysis of EUTRA/LTE TDD Uplink Signals	R&S®FSV-K105	1309.9780.02		
Analysis software				
OFDM Vector Signal Analysis	R&S®FSV-K96PC	1310.0202.06		
Distortion Analysis Software	R&S®FSV-K130PC	1310.0090.06		

Service options

Designation	Type	Order No.
Two-Year Calibration Service	R&S®CO2FSVR	Please contact your local Rohde & Schwarz office
Three-Year Calibration Service	R&S®CO3FSVR	
Five-Year Calibration Service	R&S®CO5FSVR	
One-Year Repair Service following the warranty period	R&S®RO2FSVR	
Two-Year Repair Service following the warranty period	R&S®RO3FSVR	
Four-Year Repair Service following the warranty period	R&S®RO5FSVR	

Recommended extras

Designation	Type	Order No.
Headphones		0708.9010.00
IEC/IEEE Bus Cable, 1 m	R&S®PCK	0292.2013.10
IEC/IEEE Bus Cable, 2 m	R&S®PCK	0292.2013.20
19” Rack Adapter (not for R&S®FSV-B1)	R&S®ZZA-478	1096.3248.00
Matching pads, 50/75 Ω		
L Section, matching at both ends	R&S®RAM	0358.5414.02
Series Resistor, 25 Ω, matching at one end (taken into account in instrument function RF INPUT 75 Ω)	R&S®RAZ	0358.5714.02
SWR bridges, 50 Ω		
SWR Bridge, 5 MHz to 3 GHz	R&S®ZRB2	0373.9017.5X
SWR Bridge, 40 kHz to 4 GHz	R&S®ZRC	1039.9492.5X
High-power attenuators		
100 W, 3/6/10/20/30 dB, 1 GHz	R&S®RBU100	1073.8495.xx (xx = 03/06/10/20/30)
50 W, 3/6/10/20/30 dB, 2 GHz	R&S®RBU50	1073.8695.xx (xx = 03/06/10/20/30)
50 W, 20 dB, 6 GHz	R&S®RDL50	1035.1700.52
Connectors and cables		
Probe Power Connector, 3-pin		1065.9480.00
DC blocks		
DC Block, 10 kHz to 18 GHz (type N)	R&S®FSE-Z4	1084.7443.02
For R&S®FSVR30 only		
Test Port Adapter, N male		1021.0541.00
Test Port Adapter, 3.5 mm male		1021.0529.00
Microwave Measurement Cable with test port adapter set (N male and 3.5 mm male)	R&S®FSE-Z15	1046.2002.02
For R&S®FSVR40 only		
Test Port Adapter, N male		1036.4783.00
Test Port Adapter, K male		1036.4802.00
Test Port Adapter, 2.4 mm female	R&S®FSE-Z5	1088.1627.02

Power sensors supported by the R&S®FSV-K9 option [16]

Designation	Type	Order No.
Universal Power Sensor 10 MHz to 8 GHz, 200 mW	R&S®NRP-Z11	1138.3004.02
Universal Power Sensor 10 MHz to 18 GHz, 200 mW	R&S®NRP-Z21	1137.6000.02
Universal Power Sensor 10 MHz to 18 GHz, 2 W	R&S®NRP-Z22	1137.7506.02
Universal Power Sensor 10 MHz to 18 GHz, 15 W	R&S®NRP-Z23	1137.8002.02
Universal Power Sensor 10 MHz to 18 GHz, 30 W	R&S®NRP-Z24	1137.8502.02
Power Sensor Module with Power Splitter DC to 18 GHz, 500 mW	R&S®NRP-Z27	1169.4102.02
Power Sensor Module with Power Splitter DC to 26.5 GHz, 500 mW	R&S®NRP-Z37	1169.3206.02
Thermal Power Sensor 0 Hz to 18 GHz, 100 mW	R&S®NRP-Z51	1138.0005.02
Thermal Power Sensor 0 Hz to 40 GHz, 100 mW	R&S®NRP-Z55	1138.2008.02
Thermal Power Sensor 0 Hz to 50 GHz, 100 mW	R&S®NRP-Z56	1171.8201.02
Thermal Power Sensor 0 Hz to 67 GHz, 100 mW	R&S®NRP-Z57	1171.8401.02
Wideband Power Sensor 50 MHz to 18 GHz, 100 mW	R&S®NRP-Z81	1137.9009.02
Average Power Sensor 9 kHz to 6 GHz, 200 mW	R&S®NRP-Z91	1168.8004.02
Average Power Sensor 9 kHz to 6 GHz, 2 W	R&S®NRP-Z92	1171.7005.02

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[16] For average power measurement only.

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